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VETERINARY JOURNAL

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Editorial

THE ELIMINATION OF THE TUBERCULOUS COW.

THE fight against tuberculosis has again reached a very interesting stage for the veterinarian, and it is for us at the present time to make every possible effort to hold the position for which we as a profession are best fitted, and which is in reality our right.

Mr. Thomas Parker, F.R.C.V.S., the Chief Veterinary Inspector for the City of Newcastle-on-Tyne, could not have chosen a better title than that of "The Elimination of the Tuberculous Cow" for the paper which he read last month before the Congress of the Royal Sanitary Institute held in that city, and we are sure that every word of it will be studied with interest by our readers.

We as a profession must not be behindhand in using all the means in our power to add to the pressure which is being put upon the Government at the present time to give the public milk which is clean and free from the death-dealing poison produced by the tubercle bacilli. Now that the general public are at last awakening to the white plague which is ever in their midst, and to the fact that at least a decent proportion of it can be got rid of by the provision of a clean milk supply, it is for us to individually and collectively as a profession to press the matter on every possible occasion. Each of us in our district can act like the stone which is thrown into the pond, the eddies of which, when it falls into the water, spread in circles of ever increasing size; and the new offer of the Ministry of Agriculture to provide, free of charge, doses of immunising vaccine should be accepted everywhere.

Veterinary Societies, headed by our own National Veterinary

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Association, are pressing home the necessity for the re-introduction of the Tuberculosis of Animals Order of 1914 with sundry up-to-date modifications, and if this can be an accomplished fact, there is no doubt that, accompanied by the universal immunisation of calves and young stock, these together will go a long way towards the elimination of tuberculosis from our herds and the prevention of this disease amongst our children and other susceptibles.

General Articles

THE ELIMINATION OF THE TUBERCULOUS COW.*

By THOMAS PARKER, F.R.C.V.S.,
Chief Veterinary Inspector, Newcastle-upon-Tyne.

As the majority of milk-producing cattle are tuberculous, and as comparatively few attempts up to the present time have been made to eradicate the disease from individual herds, it will be necessary at the outset, particularly as it is intended in this paper to confine our attention to the subject from the Public Health standpoint rather than that of Agriculture, to briefly distinguish between the tuberculous cow and the tuberculous milk-producing cow.

For example, on examining a number of milk-producing herds one may, depending upon the conditions of general hygiene, housing, feeding, class and selection of cattle, etc., find all the members of certain of them apparently in a good state of health; in others one may find one or several suffering from tuberculous mastitis, pneumonia, or other condition either with or without evidence of emaciation or its onset. Having found each animal within the apparently healthy herd free from any suspicion of being a tuberculous milk-producer, an extended examination of the milk supply may also give a negative result. On the application of the tuberculin test, however, one may find that more than 50 per cent. of the animals are in fact tuberculous. While it is true that we are referring to good class apparently healthy herds producing the public milk supply, it is equally true that more or less than 50 per cent. of such animals are potentially dangerous, for the disease in any one of them may commence at any moment to extend and continue until the mammary gland is involved. It will be obvious then that the menace is one that is always with us. On the other hand, the agriculturist, whether he is producing milk for sale or otherwise, does not as a rule regard the question of tuberculosis as serious so long as he is successful in

* A paper read before the Congress Meeting of the Royal Sanitary Institute, held at Newcastle-upon-Tyne January 1925.

disposing of doubtfuls from time to time early enough to prevent financial loss. To eradicate the disease from any herd would necessitate the use of tuberculin. After having determined as to the number of animals diseased, it would be necessary, if one wished to maintain a non-tuberculous herd, not only to provide the necessary accommodation for the purpose of isolation, but to arrange for re-testing and subject all new animals intended to be added to the herd to precisely similar isolation and tests, besides observe all the measures necessary to prevent infection either directly or indirectly. Where the farm premises were not only structurally fit but offered ample accommodation for purposes of isolation, the building up of a non-tuberculous dairy herd could no doubt be carried out by gradually adding to the stock from healthy heifer calves produced or reared on the premises. Perhaps one of the greatest stumbling blocks in the way of eradicating the disease is that, on the majority of farms, the facilities are inadequate for the purpose. Furthermore, many of those who really give thought to the question invariably decide on grounds of economy. Although the individual losses due to the disease may not in the great majority of cases cause financial embarrassment, the total loss annually within the country by death and deterioration must be enormous.

Total eradication of the disease can only properly commence on premises providing the necessary accommodation ; and only then, unless with State or municipal aid, where financial considerations permit. To apply the tuberculin test to all dairy herds and then reject the use of all reactors would be tantamount to immediately cutting down the milk supply to about one-half. Not only to cast adrift the apparently healthy reactors, but to replace the healthy cows going dry, would be a most serious problem, for newly calved non-tuberculous cows would have to be found to take their place. For these and other reasons the compulsory universal application of the tuberculin test does not appear at the present moment a practical proposition. Notwithstanding these facts, however, it should always be remembered that the only certain method of eliminating the tuberculous cow is that which employs that test.

As it has already been pointed out that the tuberculous cow may at any moment become a tuberculous milk-producer, it should be noted that so long as we are not permitted to employ the means of diagnosis for the detection—during life—of all tuberculous cows, it is clearly the duty of all local authorities to concentrate on the detection of the cow producing or likely to produce tuberculous milk, besides any other clinically diseased bovine likely in any way to prejudice the condition of the milk supply.

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I propose to briefly refer to the subject under the following headings, namely :—

(1) Some Reasons for Action.
(2) Why our Present Method Fails as a True Preventive.
(3) Some Suggestions.

Some Reasons for Action.

Although the huge toll taken annually of our meat supplies by the destruction of carcasses and offal on account of tuberculosis is in itself a good reason for advocating greater efforts against the disease, it is intended on this occasion to confine ourselves more particularly to the milk supply.

During the year 1923, of something like 178 samples of milk collected by inspectors of the Health Department of this city, and submitted for bacteriological examination, 8, or 4·47 per cent. were found to be tuberculous. Of the samples collected and submitted to these tests during the past seventeen years, according to the last Annual Report of the Medical Officer of Health, the percentage found tuberculous has been as low as 2 and as high as 10. During the year 1923, according to the Annual Report of the Veterinary Inspector of Birmingham, of 258 mixed samples collected at railway stations, depots, etc., arriving within that city from outside sources, 19, or 7·36 per cent., were proved to be tuberculous. No doubt the results obtained by many other large centres also go to prove the universal distribution of tuberculous milk. For the purpose of further directing attention to the widespread production of diseased milk one might now refer to the Tuberculosis Order of 1913.

This Order, made by the Board of Agriculture and Fisheries, came into operation on May 1, 1913, and was the means by which the first definite steps were taken in this country to control the more dangerous forms of the disease by requiring every person having in his possession or under his charge (1) any cow which was, or appeared to be, suffering from tuberculosis of the udder or other chronic disease of the udder, or (2) any bovine animal which was, or appeared to be, suffering from tuberculosis with emaciation, to give information of the fact, without delay, to a constable of the police for the area concerned, or to an inspector of the local authority. The local authorities were charged with the duty of investigating reports received, with the assistance of a veterinary inspector, with a view to causing the slaughter of any animal in their district shown to be suffering from one of the specified forms of the disease. The persons notifying were also required to take precautions against the mixing

of milk from suspected animals with other milk, besides being required to keep the animals under isolation pending examination by the veterinary inspector.

This Order was in operation for a period of fourteen months, when it was replaced by the Tuberculosis Order of 1914. As the latter was only in force for a few weeks, it will be more convenient to confine our attention to the previous Order.

During the operation of the Tuberculosis Order of 1913, some 8,073 animals were dealt with in Great Britain, namely, 6,671 in England and Wales and 1,402 in Scotland, exclusive of those found on examination not to be suffering from one of the scheduled forms of the disease. Of the 6,671 in England and Wales, 1,072, or 16 per cent., were diagnosed in life to be giving tubercle-infected milk, but it is not known what percentage showed clinical symptoms of udder disease. On slaughter, however, 1,000, or 93 per cent., of them exhibited tuberculosis of the udder. The remaining 5,599, or 84 per cent., of the whole were returned as suffering from tuberculosis with emaciation. Of the 1,402 dealt with in Scotland, 384, or 29 per cent., were diagnosed in life to be giving tuberculous milk or to have tuberculous udders, and upon slaughter 267, or 69 per cent., of them were found with tuberculous lesions within the udder, whilst 1,118, or 79 per cent., of the whole were returned as suffering from tuberculosis with emaciation. These figures are from the Annual Reports of Proceedings under the Diseases of Animals Acts, issued by the Ministry of Agriculture. Although they do give some indication as to the serious condition of some of the herds, they are not wholly satisfactory, possibly due to the shortness of the period during which the Order was administered, inasmuch as they do not give any indication as to what proportion of the emaciated tuberculous cattle were found with udder disease, or what was the general condition of those either giving tubercle-infected milk or presenting tuberculous lesions within the udder on slaughter. Further, the available statistics do not give us any information either as to the proportion of cows and heifers within the country that were notified as suspected, or as to the percentage of dairy herd premises within the country in respect of which suspected cows were notified. What is known, however, is that the 8,073 animals dealt with were distributed over almost an equal number of separate farms or other premises. Therefore it can be stated with a fair amount of accuracy that the Tuberculosis Order of 1913 caused to be officially dealt with in England, Wales, and Scotland 1,450 farm or dairy herd premises producing tuberculous milk, and about 6,500 similar premises housing tuberculous emaciated cattle. It will be obvious, therefore, that the putting into force of the Order referred

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to was—from the Public Health standpoint besides that of Agriculture —a step in the right direction.

When one is aware that, chiefly owing to notifications made by the owners or occupiers themselves, no fewer than 7,950 premises in Great Britain housing tuberculous bovines were dealt with, one is equally aware that not only would the animals notified mostly comprise those obviously ill, but would form not more than a very small percentage of those either clinically diseased or producing tuberculous milk. Moreover, it is quite certain that had it not been for the considerable pressure brought to bear upon the successive Governments of this country by the various Public Health authorities, the Tuberculosis Orders of 1913 and 1914 would never have been put into operation. These Orders, while in operation, because of their lacking in certain essentials regarding administrative application, merely touched the fringe of this vast subject; and since no such Order has operated during the past ten years, thousands of patients—particularly children—continue to die from disease contracted through the consumption of tuberculous milk, and the thousands that live continue to fill up the ranks of that huge army of sick and maimed, whilst no real effort is being made to arrest the cause at its source. It might now be of some advantage to offer further evidence—if that be necessary—based upon personal observations in support of the case for prevention against the potentially dangerous cow and the tuberculous milk producer.

During the past three years the writer has been fortunate enough to have the opportunity of making an extended examination, post-mortem, of dairy cows sent into the city for disposal. These animals were from five different herds, four of which were completely slaughtered out on account of outbreaks of foot-and-mouth disease. Four of the herds were owned by dairymen who are engaged exclusively in the milk business, and who replace the fattened off or dry cows, going out from time to time, by new purchases at the various cow markets, and house their animals on premises other than a farm, whilst the animals from the fifth herd comprised first-class conditioned cattle from a farm upon which a number are from time to time bred and reared for the purposes of milk production. The total number of animals examined as indicated was 121, and of these 94, or 77·68 per cent., were found affected with tuberculosis. In three of the cases the mammary tissue was involved, whilst in two others the disease was such, as to extent and distribution, that these animals also may probably have been liberating tubercle bacilli along with the milk.

Not knowing when disease within an animal may extend and

involve the milk produced, the presence of 94 diseased out of a total of 121 may be serious. It appears more so when we are aware that amongst the 94 were three certainly capable of producing tuberculous milk. The extent to which consumers, numerically, are exposed to the risk of infection becomes still more apparent when it is pointed out that the three cows with diseased mammæ were, along with other 42 tuberculous animals, included amongst the 59 cows which made up three of the five herds, and especially when it is remembered that it is the rule to mix the milk at dairy premises prior to distribution.

It is only when one has the opportunity of making a complete examination of the carcasses in the presence of all the internal organs, arranged in an orderly manner, that one can obtain a true conception as to the percentage of animals that are diseased, besides the extent to which, in each individual case, they are affected and the probable channels of infection.

Statistics obtained under these conditions, as was found on examining the 121 cows referred to, are rather different to those obtained as a result of routine meat inspection; that is to say, where the inspectors are moving from slaughterhouse to slaughterhouse scattered over a wide area, because while slaughtering is going on within the various premises the internal organs, when removed from the carcasses, are invariably mixed, and in many cases removed before they are inspected. Besides, many carcasses are sent into the city unaccompanied by any of the internal organs. Nevertheless, within the city during the year 1923, even under this system, of the total number (excluding mutton) of carcasses, parts of carcasses, and organs condemned as unfit, tuberculosis was found to be the cause in 176, or 56·23 per cent., of the cases. Of the cows slaughtered, amongst those exhibiting lesions of tuberculosis, 66·2 per cent. were partly condemned, whilst the remaining 33·8 per cent. were totally condemned as unfit for human consumption.

Undoubtedly the strongest reason of all why immediate and universal action should be considered will be found in an answer to the following question, namely: "To what extent is the health of the community affected by the consumption of ordinary market milk"?

In briefly replying to this question, it must be understood that for this purpose one means by ordinary market milk, milk containing tubercle bacilli as it leaves the cow, or milk that has been mixed with the latter before leaving the dairy.

According to the Final Report of the Royal Commission on Human and Animal Tuberculosis, 108 cases of tuberculosis in the human subject were investigated by that Commission. Of these, 29 were

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those of primary abdominal tuberculosis, that is to say cases in which the seat of infection was the intestinal canal, in other words, where some material swallowed had first reached the bowels before entering and infecting the individual. Of the 29 cases, all of which died, 18 were children between one and three years; 6 between three and five years; 2 were seven years; 1 fifteen years; 1 person eighteen years, and another seventy years. In 14 of the cases the disease was due to the bovine tubercle bacilli, 13 being due to the human tubercle bacillus. In the two remaining cases, one aged eighteen and the other seventy years, both the human and the bovine types of tubercle bacilli were found. Of the 14 cases in which the disease was due to the bovine tubercle bacillus, 10 were from one to three years of age; 3 were from four to five years, whilst 1 was aged eight years. Since these startling facts, established by the Royal Commission, were published more information of a convincing character has been forthcoming.

For example, Drs. Eastwood, F. Griffith, and A. Stanley Griffith * found in a series of 195 children, dying from all causes between the ages of two and ten years, tubercle bacilli of the bovine type in 18 of the cases, in 80 of the cases tubercle bacilli of the human type, and in 1 case both types. Of the 98 cases in which tubercle bacilli were found, 17 showed bovine bacilli alone, and in 11 of these tuberculosis was the actual cause of death.

In the city of Edinburgh, Dr. Mitchell † carried out some investigations for the purpose of determining the relative frequency of infection with the bovine and the human types of tubercle bacilli in cases of disease of the cervical gland of children. Seventy-two consecutive cases were thus studied, and the results obtained showed that in 65, or 88·6 per cent., of these the bacillus responsible was of the bovine type, and in the remaining 7 of the human type.

In his most exhaustive report, Dr. Mitchell in his general conclusions states: "The concentration of attention on the existence of human sources of infection has in the past quite overshadowed the evidence that the drinking of milk is an important factor in the infection of children with tuberculosis. Having demonstrated that a larger percentage of cases of tuberculous cervical glands in children is due to the bovine tubercle bacillus than previously believed, the need for immediate action is evident, and becomes an absolute necessity. Bovine tuberculosis can, therefore, no longer be considered a negligible factor in respect to the spread of tuberculosis amongst children, more especially since unsterilised cow's milk in this country

* Annual Report of the Local Government Board (Medical Officer), 1913–14.
† *British Medical Journal*, January 17, 1914.

is a vehicle by which tubercle bacilli must most frequently be introduced into the bodies of children. The powers at present vested in our local authorities are grossly inadequate, and it seems to me to be our special duty to endeavour to prevent this enormous and entirely preventable amount of tuberculosis amongst children. It is a national problem, and the earlier it is faced the more easily will it be solved."

Dr. A. Stanley Griffith,* at the National Milk Conference held in London in October 1922, on the basis of more than 1,200 cases in which the type of tubercle bacillus had been determined, stated: "Bovine tubercle bacilli play a part in the causation of all the clinical types of human tuberculosis, and can produce tuberculous lesions in every organ and gland indistinguishable from tuberculosis of human origin.

"The relative frequency with which bovine tubercle bacilli are found in human tuberculosis varies in the different clinical forms of the disease at different age periods. It is highest in children under five years of age and in those forms of tuberculosis which affect primarily the cervical glands and abdominal organs. In such forms of tuberculosis the percentage of bovine infections in children under five exceeds 80 per cent.

"In cervical gland tuberculosis and lupus at all ages infection of bovine origin accounts for about half the cases, while in bone and joint tuberculosis, genito-urinary tuberculosis, and tuberculous meningitis, diseases caused by bacilli which have been distributed over the body by the blood-stream, the proportion of bovine infections ranges from one-fifth to one-sixth of the cases examined. These figures prove conclusively that a very considerable amount of disease and loss of life, especially in childhood, is caused in this country by the bacillus of bovine tuberculosis."

Why Our Present Method Fails.

The chief reason why our present method fails as a true preventive is that there is no attempt to apply, with any degree of uniformity, means for the detection and control of the cause of the production of tuberculous milk at its source. For example, the collection of samples of milk either at stations, dairy premises, or elsewhere, and subjecting the same to tests for the presence of tubercle bacilli is not by any means an adequate system of protection :—

(*a*) Because not only the milk of which the sample formed part, but also the daily supply from the same source will have been consumed, probably in most instances for weeks before the sample has been proved tuberculous or otherwise ;

* *The Journal of Comparative Pathology and Therapeutics*, Vol. xxxvi, p. 164.

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(*b*) Because, although the sample has been proved tuberculous, the animal producing it may in the meantime be removed to some other herd and lost sight of.

It should be remembered, however, that in the absence of any well-regulated system of prevention, the collection and examination of samples of milk is most valuable as a means of demonstrating the necessity for immediate attention to the herd in question, and should be continued as a supplement even to efficient inspection.

It has already been stated that the putting into operation of the Tuberculosis Order of 1913 was a step in the right direction. To put into operation such a measure which makes it illegal to offer for sale milk from cows suffering from certain forms of tuberculosis, and at the same time places the responsibility of detecting these animals on the shoulders of the owner or person in charge, is not likely to prove an adequate safeguard, for the animals may be kept in use until accidentally detected or found by clinical examination in an endeavour to trace back a milk sample found tuberculous at some remote destination, or they may not be detected until slaughter or not at all. It will be obvious, therefore, that apart from a small proportion of cases notified, under such a measure public protection is practically reduced to one of accidental occurrence.

Some Suggestions.

According to the Milk and Dairies (Amendment) Act, 1922, the Milk and Dairies (Consolidation) Act, 1915, comes into operation on September 1, 1925. Article 5 (1) of the 1922 Act makes it an offence to dispose of milk from a cow with a tuberculous udder under penalty of a fine for a first offence of £20, and for a second offence of £100, or to imprisonment with or without hard labour for a period of six months, or to both such fine and imprisonment; whereas the 1915 Act makes it an offence not only to dispose of for human consumption, but also to allow to be used in the manufacture of products for human consumption, milk from any cow giving, or likely to be giving, tuberculous milk, or suffering from certain conditions other than tuberculosis, including actinomycosis, anthrax, foot-and-mouth disease, etc. Article 1 (1) of this Act empowers the Local Government Board (Ministry of Health) to make general or special Orders for practically all the purposes (which include the inspection of cattle) required to secure—if carried out along with a Tuberculosis Order—a wholesome milk supply.

Whenever the Acts referred to and any Orders made by the Ministry of Health come into operation, an Order similar in effect

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to the Tuberculosis Order of 1914, of the Ministry of Agriculture, should come into force at the same time.

It is absolutely essential in any attempt to secure a wholesome milk supply to have all clinically tuberculous cattle removed from dairy herds, and this cannot possibly be done without regular veterinary inspection of all dairy cattle throughout the country. Under the previously mentioned Acts, not only are local authorities permitted to do this, but the Local Government Board (Ministry of Health) is empowered to make Orders to enforce it. As to how often, annually, the dairy herds should be examined will depend upon whether the inspection is universal or otherwise. In any case, the herds should be examined at least once every three months, and it should be made compulsory for every dairyman to notify the local authority upon the arrival of any new animal into his herd. I would also strongly urge that it should be made illegal to offer for sale, whether publicly or privately, any cow which has been "stocked" or "hefted" either by temporarily stopping up the teat canal or by deliberately withholding the normal operation of milking. At all times the application of the tuberculin test, the removal of all tuberculous cattle, and the building up of tubercle-free herds should be encouraged by legislation or otherwise. The organisation and supervision of the work under the Acts and Orders of the Ministries of Health and Agriculture referred to, besides those Orders of the Ministry of Agriculture relating to other diseases than tuberculosis, including those set out in the Second Schedule of the Milk and Dairies (Consolidation) Act, 1915, of the Ministry of Health, will require careful consideration.

When such control has been operating for some time, the condition of the herds would probably become such that still greater measures could be adopted for the purpose of increasing the number of those tubercle-free. At a later stage it might then be practicable, both from an administrative and financial standpoint, to completely rid certain defined areas of bovine tuberculosis without unduly depleting the public milk supply, and at the same time provide non-tuberculous animals in sufficient numbers to also meet the demands of many dairymen whose only premises are town cowsheds. It would appear certain that, having regard to all the circumstances, the progress of eradication of bovine tuberculosis will be slow. Nevertheless, it is not impossible, providing great perseverence be exercised by all concerned, for great strides to be made in that direction.

It should never be forgotten, however, that the results we all desire will be attainable only in the inverse ratio as to the completeness and regularity of inspection and, incidentally, the promptness with which the disease is dealt with at its source. In the way indi-

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cated, and in no other, can we hope to arrive at a stage of affairs when it can honestly be said that we are attempting to eliminate the offending cow, and thus prevent one of the completest and most valuable of all foods becoming charged with the germs of a dangerous disease.

AN ANIMAL CREMATORIUM FOR STANDING CAMPS.

By Major J. R. HODGKINS, D.S.O., F.R.C.V.S.,
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In a standing camp like those found on the North-West Frontier of India it is necessary to have some method of disposal of animal carcasses within the precincts of the camp. There is no sale for hides, and burial would mean a not inconsiderable working party and guard.

The method of cremation is employed in this camp, and the crematorium is of the dimension laid down in *Animal Management*,

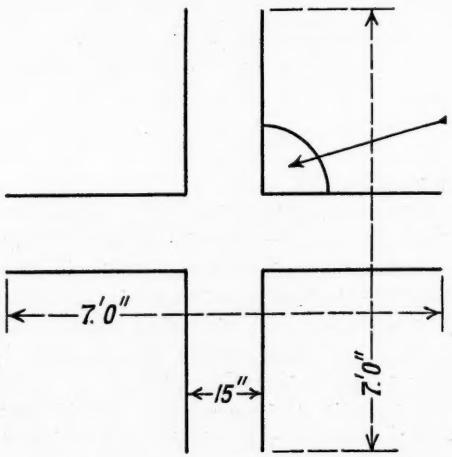

Fig. 1.—Ground Plan. The Arrow indicates one of the Revetted Angles.

1923, p. 314. That is to say, it consists of a trench in the ground the shape of a cross, each trench 7 feet long, 15 inches wide, and 18 inches deep at the centre where the two meet, the trench working out to ground level.

The earth taken out is thrown into the angles formed by the trench, and some material is placed across this to support the carcase.

Now, to make this into a more or less permanent structure, the following additions have been made :—

(1) The earth in the angles has been revetted and consolidated,

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FIG 2.—The Structure Ready for Fixing.

bringing it considerably above the level of the trench. This helps the draught enormously.

FIG 3.—Cremation Complete.

(2) Instead of the two pieces of iron usually employed, a "grid" has been made of angle iron which rests very solidly on the masonry in the angles.

VETERINARY THERAPEUTICS, PAST AND FUTURE.

By Lieut.-Colonel J. W. RAINEY, C.B.E., M.R.C.V.S.,
London.

At a recent meeting of the British Medical Association a speaker is reported to have stated, without dissent from his audience, that the time had arrived when two-thirds of the drugs in the British Pharmacopœia should be thrown overboard.

It may with equal truth be stated that 80 per cent. of the drugs recommended for the medical treatment of animals might be discarded, with no disadvantage to the patients.

Those of the teachers in our veterinary schools who have to expound the ritual and mysteries of materia medica must often, if they are thoughtful men, compare their position with that of an enlightened priesthood in a higher calling than their own.

Apart from anæsthetics, narcotics, antiseptics, and other drugs used for external purposes, there are very few medicinal agents which are *known* to influence favourably the course of disease.

If we take out of our pharmacies those drugs prescribed from custom, from prejudice, or from faith, there may be left for the purpose of internal administration twenty preparations whose use is justified by scientific proof.

In a recent clinical article in one of our journals a writer, in discussing a certain condition, says briefly that " salol is specific in these cases," and thus salol is baptized into the faith. By such means of advocacy and professional prestige our unwieldy system of therapeutics has been built up to endure for a few generations and then, in those parts that are not founded on the rock of scientific proof, to crumple away.

Let one example be given of the instability of the edifice.

Since the days of St. Bel, hundreds, perhaps thousands, of tons of sulphate of iron have been prescribed for horses by veterinary practitioners, but so far as the writer knows there is no proof that this drug as a tonic affects the condition of a horse to an appreciable extent.

It is not credible that with opportunity for observation on such a vast scale this proof should be lacking if in fact there is a positive advantage in giving this or any other drug commonly used for tonic purposes.

No pains have been spared to establish by scientifically controlled experiments the relative values of foods and the action of vitamins,

but sulphate of iron for instance, which by generations of veterinary practitioners has been supposed to assist in restoring health where food alone is inadequate, has been put to no test.

New drugs are carefully tested, but the old ones are sanctified by age. It would not be impossible, for example at the end of a long drought in South Africa or Australia, to arrange a control test for a hundred debilitated horses, half the number to receive iron sulphate, and half to receive none ; but the test so far as the writer knows has never been made.

Until such a test has been made of these venerable remedies, it may be assumed quite reasonably that sulphate of iron and its hoary contemporaries are unnecessary in the treatment of equine diseases.

The foregoing example is given simply to illustrate the point on which these remarks are based, and not because of any prejudice against sulphate of iron, which the writer, from sheer custom, continues to prescribe.

The time has arrived when the organized veterinary services might make scientific tests of many drugs with a view to placing the question of their utility beyond doubt.

In America excellent work has been done in testing the utility of vermicides, and in our overseas Dominions and Colonies adequate tests have been made of remedies recommended for the treatment of piroplasmosis and trypanosomiasis.

But in nearly every private veterinary practice in Europe the monotonous administration of most of the drugs recommended a hundred years ago still goes on for no better reason than the opinion or faith of the prescriber. Similarly, in regard to biological products, it is unfortunate that our knowledge is so nebulous.

A practitioner writes to a professional journal to say that for such and such a period he injected a vaccine into a horse that had a chronic discharge from the wither. On such and such a date a piece of necrotic tissue came away, and thereafter the lesion healed, so that beyond doubt the vaccine was remedial.

A surgeon treating the same condition removes the piece of necrotic tissue with his knife, and the wound similarly heals, therefore he thinks that vaccine in this case would have been useless.

One man treats ten cases of pneumonia with a biological product, another with fresh air alone, and all twenty cases recover, and the alleged remedy is wonderful or useless as the case may be.

These are the matters in which light is needed, and this light the veterinary profession may expect from the organized veterinary services and research institutions into which so much of its talent goes.

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RAVAGES CAUSED BY THE GOLOUBATZ FLY IN ROUMANIA: ITS ATTACKS ON ANIMALS AND MAN.

By T. CIUREA,
Professor of Parasitology at the Faculty of Veterinary Medicine of Bucharest, and
Dr. G. DINULESCU,
*Veterinary Captain in the Roumanian Army.**

Attacks Against Animals.

Introduction.—In Europe one of the largest places of origin of Simulidæ is that represented by the Goloubatz fly (*Simulium columbaczense* Schiner),† which occurs in Jugoslavia in the departments of Pojarevatz and Crania, on the right side of the Danube, and in Roumania in the departments of Banat, Tunis, Torontal, and Caras-Severin on the left side. In this mountainous region, which covers about 22,000 kilometres, there is hardly any little water-course where one cannot find one of the evolution forms of this fly (Tömösvary).

From this hot bed almost every year in the spring ‡ the Goloubatz fly invades in more or less large swarms some of our departments of Transylvania and Oltenia. The rural population of these departments know the fly well enough and more or less, also, the practical methods of protecting the animals from them so that the number of subjects killed annually by this Simulium rarely exceeds some ten or so. But exceptionally this year (1923) immense swarms of Simulidæ having the appearance of clouds have invaded not only Banat, Transylvania, and Oltenia (with the exception of the department of Romanati), but also a great part of Valachia, where the population do not know Goloubatz fly and the means of protecting animals from it. On this account it can be explained how in a few days 16,000 animals have been killed by the venomous

* Translated from *Annals Tropical Médecine et Parasitologie*, Vol. xviii, No. 3.—G.M.

† *Simulium columbaczense* takes its name from the ancient château of Goloubatz, situated on the right bank of the Danube, in the department of Pojarevatz, in Jugoslavia; it was formerly believed that this *Simulium* went through its stages of development principally in the little streams that flow near the château.

From researches we have made on Simulidæ of the fauna of Roumania, not only *Simulium columbaczense*, but also other species of Simulidæ occur here whose nymphæ possess four, six, or eight tracheas on each side, and are found in large numbers in the small streams of this region.

‡ In Banat, according to a local legend, Goloubatz flies hatch in great numbers in the spring in a grotto called "Gaura cu musca" (the fly grotto), which is on the left bank of the Danube in the mountains of the department of Caras-Severin, near the village of Coronini. According to this legend the flies were produced here from the putrified head of a dragon killed by Hercules,

bites of this insect. The fly has also killed numerous wild animals such as roebuck, hares, and foxes. Even man himself has suffered from it.

The Two Swarms of Simulidæ; the Time of Their Appearance; the Departments which they have Invaded, and the Duration of the Invasion.—According to information furnished by veterinarians, Goloubatz flies made their appearance in small numbers in the department of Caras-Severin of Banat. Towards the middle of the same month they became more numerous and formed two great swarms, of which one was directed at first towards the north and the other a little later to the east.

(*a*) *The first swarm*, directed towards the north, invaded the south-west departments of Banat and Transylvania. They were active from the middle of April to the end of July.

(*b*) *The second swarm*, directed towards the east, invaded Oltenia and Valachia, and passed into seventeen departments of Roumania. The invasion commenced on April 21st and lasted forty days.

The Flies of Goloubatz have been Carried by the Wind.—There are two opinions concerning the movement of swarms of Simulidæ: according to one the swarms travel along the water-courses; according to the other they are carried passively by the wind. If we observe the invasion chart we find that the direction is perpendicular to the water-courses. This shows that there is passive transport of the insects. Besides, from inquiries we have made from veterinarians with reference to the various questions concerning invasion, almost all have declared that the flies have been carried from their places of origin by the wind, which has blown for some time before the invasion. We also believe that the insects may be transported from one place to another by accompanying the animals they desire to attack. Thus we have frequently seen villages invaded in the evening by Simulidæ coming in with the animals returning from pasture.

The Number of Animals Killed, their Market Value and Compensation Granted by the Roumanian Government to the Most Experienced Farmers.—During the period mentioned, which has been furnished to us by the Minister of Agriculture, the Goloubatz flies have killed 16,474 domestic animals. Of these, 10,592 were cattle, 1,585 horses, 2,834 pigs, 915 sheep, and 460 goats. The largest number of deaths was 8,178 in Oltenia and 6,137 in Valachia. It is interesting to mention that most veterinarians state that the bites of the flies have only been deadly during the first four or five days of invasion, although they remained more than one or two weeks in one locality, and that their bites were numerous only at the commencement of the invasion,

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This is explained, we believe, by the setting up of a state of immunity in those animals that have resisted a first attack.

The value of the animals killed by the fly represents a capital of 63,059,000 lei (about £78,823), to which one must add losses caused by cessation of agricultural work which resulted. The Roumanian Government, in order to help the most approved farmers, put at their disposal a sum of 15,000,000 lei (£18,750).

The Manner in which the Fly Attacks Animals and the Time of Day when it is Aggressive.—On their arrival the flies alight on the body of the animals, especially on the mucosæ of the natural orifices and

Fig. 1.—Cow with Œdema of Brisket Caused by Bites of Goloubatz Fly.

on the finest parts of the skin—lips, nostrils, eyes, ears, dewlap, chest, ventral face of the abdomen, udder, genital organs, anus, and internal face of the limbs. The flies thrust their proboscis deeply into the skin and remain fixed until they have gorged themselves with blood, about five minutes. Sometimes they become so gorged that they can no longer fly away. Most often the beasts attacked at pasture are troubled and run for many kilometres. Sometimes they enter the water to get rid of the flies. Horses and swine return to their sheds. Sheep and goats suffer less if they are not shorn. We have noticed also that animals with a black coat are attacked more than others. This explains Tömösvary's assertion that of all domestic animals, buffaloes suffer the most during a fly invasion. The flies remain for a short time in the plain and then are protected

by the forests. There, in extempore shelters, they live for a long time and make a great number of animal victims. The flies are aggressive only during the day from ten o'clock in the morning to four in the afternoon. During the warmest hours of the day and during the night Simulidæ remain hidden in caves or under the leaves of plants.

Local Symptoms.—The bite of Simulidæ resembles that of a flea. The blood oozes from it, and when several bites occur in the same region, it resembles a large bleeding wound. The skin of an animal

Fig. 2.—Peasants Bitten by Simulidæ. One sees Ecchymoses, Pimples, and Œdema of the Leg.

attacked takes on a speckled aspect from the numerous bites which mostly coalesce, forming hæmorrhagic spots more or less extensive. At the place bitten an induration in the shape of a small pimple forms. In the case of multiple bites, the pimples coalesce into a large inflammatory œdema, hard and very painful, which makes the animal withdraw itself on palpation. The œdema of the head in the horse gives one the impression of an animal affected with purpura. Œdema of the abdomen, sheath, and penis is frequently seen in the horse, whilst that of the dewlap is common in cattle. The abdominal œdema is sometimes so large as to give one the impression of an animal with ventral hernia. That of the penis hinders micturition and causes death by uræmia. Animals with

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œdema of the limbs walk with difficulty as if affected with articular rheumatism.

General Symptoms.—Animals badly bitten show symptoms of imminent asphyxia. They move with difficulty, have the mouth half open, pendant tongue, anxious eyes, and suffocating respiration; finally they fall and die in a few hours (Triminoiv). This is seen oftenest in animals attacked by the fly while at work and which have no chance of defending themselves. Animals having suffered on account of the bites of the fly, but which do not die in the first few hours after attack, become very irritable, no longer eat, and have rigors. Temperature is normal or slightly raised, respiration accelerated and dyspnœic, pulse accelerated and often of a venous character. Animals become apathetic, and respiration and pulse almost imperceptible. Temperature falls to subnormal. The victims remain nearly all the time recumbent in the sterno-abdominal position (the head turned towards the tail like cows affected with milk fever [Velcov]). They quietly keep this attitude until death supervenes after six or seven days.

When animals recover they get better gradually and return to normal after seven or eight days.

Lesions.—At post-mortem the animals show congestions and degeneration of the principal viscera, especially the heart, liver, and kidney.

Practical Means to Prevent Fly Attacks.—In the departments most often invaded the means employed by the rural population against the attack of this insect are as follows:—

On the arrival of the fly all the animals are retained during the day in dark stables and are taken to pasture and work only at night. To hinder the fly entering the stables, smoke is produced by burning dung in the neighbourhood of the door. If one in obliged to conduct the animals to pasture during the day, smoke is produced around them. In the same way one protects the animals at work by burning straw and dung in a bucket suspended from the anterior extremity of the pole.

Farmers further prevent the attack of the fly by mixtures and decoctions put on the most vulnerable parts of the body. Amongst the decoctions used are those of absinthe leaves, walnut, hazel, and even tobacco in water or vinegar (in an average proportion of 1 in 10). Mixtures of mineral or vegetable tar with rancid or sweet lard in equal proportions are also used.

It is interesting to know how the mountain peasants, especially those of the department of Mehedinti, manufacture vegetable tar by using the wood of *Pinus Silvestris*. For this object they make a

conical ditch in the ground 1 metre in depth with the base uppermost and the bottom of which communicates with the outside air by means of a small canal. In this pit pieces of pinewood 1 metre long and 4 to 5 centimetres broad are put. The wood is arranged obliquely in the form of a cone which exceeds the ditch by ½ metre. The wood above is covered with earth leaving a small hole at the superior part, where the wood is set alight. The combustion thus made descends from above to below. The

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FIG. 3.—Roumanian Peasants at Work in the Field during a Fly Attack. Buckets attached to pole and smoke being produced.

resin which is distilled flows by the lower canal into a vase. The resin, before use, is mixed with milk and flour, forming a paste which adheres well to the hair. With this paste a general anointing is first made, which is repeated every three days on the finest and most vulnerable parts of the body.

CURATIVE MEANS.—Frictions or compresses to the affected regions with brine or with brine prepared with a solution of vinegar.

Veterinarians have used ammonia solutions to neutralise the action of the venom inoculated into the wounds. Cold baths and the application of ice to combat local inflammation have also been used,

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As internal medication much success has followed the use of cardiac tonics: coffee, digitalis, and caffeine injections. Bleeding has also been practised.

Finally, according to veterinary evidence, many animals gravely bitten by this insect have been slaughtered by the owners and the meat consumed without any danger.

Attack on Man.

Man also has suffered this year as a result of the heavy invasion of Roumania by the Goloubatz fly. According to information given

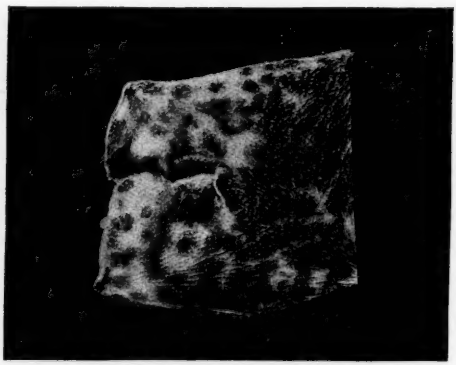

Fig. 4.—Skin of an Ox Bitten by the Fly.

by the doctors the bites of these insects have provoked in man local and general morbid effects, but no fatalities as in animals.

It is to Doctor Cadere, of Campulung, in the department of Muscel, that we owe a very interesting clinical study of the phenomena produced in man by the bites of this insect.

Local Symptoms.—The fly bites man on his head, hands, and feet. Soon after the bite there is a sensation of smarting followed by an intense burning feeling. From the wound, which is very small, there flows a veritable stream of blood quite disproportionate to the size of the puncture. This blood has lost its normal characteristics; it is more fluid and coagulates with much difficulty.

A few hours later there appears around the puncture a reddish, circular spot similar to that produced by a flea or bug.

After twelve to twenty-four hours these spots increase, and when

they are numerous form patches of an erysipelas aspect. These patches are slightly raised at the edges, of raspberry colour, and may affect the whole region: face, arms, legs. These then seem affected with a true reticular lymphangitis. The ailing region is more sensible and warmer.

At the places bitten little pimples form, from the summit of which flows a turbid serosity.

In a more advanced phase and in grave cases the lesions progress towards œdematous infiltration of the skin, which becomes pale even to glossy white. On palpating the region severe pain is evinced, and one finds that the œdema is firm, and that it does not put on pressure as in ordinary œdemas.

Around the bites little vesicles appear containing a clear serosity disposed in a semicircle or circle similar to that which surrounds the centre of a malignant pustule.

In slight cases the vesicles dry up and disappear in forty-eight to sixty hours. In grave cases the vesicles form pustules which burst in twelve to twenty-four hours and produce ulcerations of a dirty aspect. The central spot mortifies, and is thrown off as a slough, measuring 2–6 centimetres. The regeneration of tissue occurs slowly (ten to fifteen days), leaving a whitish cicatrix.

The lymphatic glands take part in the inflammatory process according to the degree of the local alterations. Thus in slight cases they are only sensitive, in grave cases they are hypertrophied and very painful.

General Symptoms.—These vary according to the gravity of the local lesions. When these lesions are slight there is only indisposition, agitation, and a tingling all over the body; when they are grave the temperature falls (36° C.), there is an ice-cold feeling with chilling of the extremities, a soft pulse, diarrhœa, and a transient oliguria. As the local alterations abate the general symptoms disappear and the patients get well.

Treatment.—Ointments with ammonia liniment. As internal medication, diuretics, cardiac tonics, and calcium chloride in cases accompanied by profuse hæmorrhage.

Prophylaxis.—This consists chiefly in protection against the bites of the fly, of attackable regions, using various means, such as a mask or a shaped cloth, gloves and shoes. Fatty or oily substances, ammonia compounds, or volatile essences rubbed on the parts prevent attack.

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PRIMARY GRANULOMA IN THE RABBIT, WITH SECONDARY LYMPHOCYTIC INFILTRATION OF THE VISCERA.

By C. C. TWORT and K. H. HARE.
From the Pathology Department, St. Bartholomew's Hospital.

Some two years ago, while we were carrying out researches on lymphadenoma and the allied blood diseases, the microsporidial disease of rabbits was first encountered in this country. Since our original publication on the subject in this Journal,* another and altogether different granulomatous disease of the rabbit has broken out spontaneously among our stock. In addition, in one rabbit (No. 47), quite exceptional pathological changes of an infiltrative character have been observed, but no definite conclusions could be arrived at as regards the exact nature of the changes or of the etiological factor concerned. It will be of advantage first of all to study the history of this rabbit in some detail before a description is given of the granulomatous condition.

The animal received, on August 14, 1922, to August 29, 1922, five intravenous injections of lymphadenomatous lymphatic gland, which had been preserved in pure glycerine. The animal kept healthy for two years, when it commenced to show signs of illness, but they were only transitory. Blood counts were normal. On December 5, 1924, it again became ill, and was found dead the next morning. Unfortunately death took place during the week-end, and the post-mortem was carried out by our assistant, most of the organs being placed directly in fixative solutions, and the remainder of the carcase on ice.

The macroscopical appearances were remarkable. The animal was well nourished, with no evidence of diarrhœa, external granulomatous swellings, acaris, etc. There was some œdema of the lungs and a little pericarditis, but the chief change found in the thorax was a condition of marked myocarditis. There was a peculiar appearance of the surface of the organ, the nature of which was doubtful. It consisted of round, raised, greyish, glistening areas, varying in size from a diameter of 1 to 5 mm., and which on section were seen to penetrate deeply into the muscle. The edges were not sharply demarcated, but faded gradually into the more or less normal tissues.

In the abdominal cavity evidence of extensive disease was found, the most striking being an unusual enlargement of the mesenteric lymphatic glands. Instead of there being the small lump of soft, watery, pigmented glands, there was a large mass, at least ten times the size of the normal organ, of fairly firm, greyish tissue, similar in appearance to the nodules seen in the heart muscle. Both kidneys

* The Veterinary Journal, June 1922, p. 194.

showed a condition also identical with that found in the heart muscle, the glistening nodules being more evident after removal of the easily stripped capsule. The spleen was rather swollen and soft, but no definite nodules were to be seen, while the liver, with the exception of a little nutmeg appearance, was normal to the naked eye. The only other organs showing obvious disease were the suprarenals, both of which were considerably enlarged, and on section appeared to have both cortex and medulla affected, especially the latter. Unfortunately, the bone-marrow in this case was overlooked, and it will be seen later, when the microscopical appearances are described, how the lack of this organ rendered the ultimate diagnosis of the condition more difficult. It is to be noted that no changes were to be seen in the central nervous system and the cerebro-spinal fluid ; there was no sign of granulomatous formation in the throat, nose, orbit, intestinal tract, etc., there was no diarrhœa, and no evidence of coccidiosis or worm disease.

The urine was somewhat turbid, and contained granular casts, and some cell casts and squames. Blood cultures were sterile, as were also cultures made from the liver. Animals injected with blood and with washings from the liver cultures remain at present healthy, and show no blood changes.

Microscopical Appearance of the Organs.

Heart.—Between the muscle bundles there was very marked infiltration of large mononuclear cells, and as the infiltrating streams were traced towards the outer surface of the organ they widened at the expense of the muscular tissue, and finally blended in a mass of mononuclear cells, with an absence of normal tissue.

Lungs.—Besides evidence of chronic inflammation and œdema, there were foci of large mononuclear cells. The cells of the normal lymph nodes in the neighbourhood of the bronchi were replaced by the large mononuclear cells, the nodes being larger and more conspicuous than normal.

Mesenteric Lymphatic Glands.—The large cells had overwhelmed the normal cells of the organ, with the capsule and periglandular areolar and fatty tissue involved ; there was also congestion and hæmorrhages with commencing organisation of the blood-clots with large and small mononuclear cells.

Kidneys.—A condition of infiltration of large mononuclear cells identical with that found in the heart. As in the heart, the infiltration was patchy, parts of the organ being quite free from infiltrating cells.

Suprarenals.—Congested, swollen organs, the capsule being

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infiltrated with the typical large mononuclear cells, which dipped into the substance of the gland and had damaged especially the medulla.

Liver.—Some fatty degeneration of the parenchyma, and evidence of a little periportal inflammation, but only an occasional large mononuclear cell similar to those found in other organs was seen.

Spleen.—A congested organ with the large mononuclear cells abundant in the Malpighian bodies and to a less extent in the pulp.

Stomach.—Great destruction of the mucosa by masses of invading large mononuclear cells. In the block of tissue examined the muscularis mucosæ was intact, except in one position where the infiltrating cells had burst through and invaded the submucosa for a considerable distance.

So much for the pathological findings. The resulting questions to be resolved are: The etiological factor or factors concerned in the production of the disease and the exact nature and classification of the disease, and the relation of the disease to allied morbid processes of man.

It would appear to be highly improbable that the repeated inoculation of lymphadenomatous glycerinated lymphatic glands played any part in the production of the condition. Not only are there many obvious reasons against such an idea, which, as they belong to general broad biological questions relating to infection and immunity would take up too much space to discuss here, but among many other animals subjected to repeated injections of lymphadenomatous material no single instance of a similar condition has been found. Two of the animals received as many as thirty-three and thirty-five intravenous injections of glycerinated gland, and were apparently unaffected during the experiment. Also, from the descriptions of the organs already given, it is apparent that the condition in Rabbit 47 is in every way different to that of lymphadenoma of man; but, of course, whatever argument one may use, it would be inadmissible to exclude definitely the possibility that the injections may have been the predisposing factor in exciting the production of the morbid process.

According to our own views, the disease originated from quite another source, and our reasons for thinking so will be mentioned in the discussion on the nature of the disease. In forming an opinion as to the exact nature of the disease, a careful study of the invading mononuclear cells was necessary. The cells have a large, well-stained, central nucleus, usually round, with a considerable amount of surrounding hyaline protoplasm which takes on the pyronin of Pappenheim-Unna's stain. From the position of the nucleus, the disposition of the chromatin, the hyaline protoplasm, and reaction of the cells to other stains, we are apparently not concerned with ordinary plasma

cells, although designated as such by some observers. The cells have much more the appearance of large lymphocytes, and to our minds there is no doubt they have their origin in the lymphatic glands, where typical members have always been found in the presumably normal glands of many rabbits examined. From the appearance of the individual cells and from their mode of invasion of the organs, it would thus seem that we are dealing with a case of lymphatic leucæmia, and this is the diagnosis registered by several experts who very kindly examined our specimens. Points to be noted, however, are that mitosis was very active, that the blood showed no evidence of increase of lymphocytes, and thus the condition was in any case aleucæmic, and a very peculiar fact was that the liver, above all organs, was apparently not involved. It will be remembered that the lymphatic leucæmia of fowls is always aleucæmic; on the other hand, the liver is infiltrated. Other experts have favoured a diagnosis of new growth, but without being at all dogmatic in their opinion.

We are inclined to think that the condition is that of a lymphatic leucæmia, secondary to infection with a certain streptothrix which we have met with in recent years as a cause of granulomata in more than a dozen rabbits. In the case of Rabbit 47, the primary granuloma may have cured spontaneously, and allowed the animal to live long enough to develop the secondary leucæmia, while in the other animals the primary growth had killed. A short description will now be given of the granulomatous disease.

THE GRANULOMA DISEASE.—The disease occurs spontaneously in the rabbit, and the tumours have been found in many situations, including the frænum of the tongue and its upper surface, tonsils, œsophagus, larynx, nasal cavities, orbit, and in the walls of both ventricles of the heart. They are sometimes single and sometimes multiple. The disease can usually be diagnosed during life, and the animal in this case has been killed at once; on occasions, however, death has taken place suddenly from respiratory obstruction. There are usually profound blood changes, commencing with an anæmia and terminating with a very high polynucleosis, there being a great deficiency in the fluid content of the blood. The thick, tarry blood, when withdrawn, rapidly clots, and two distinct layers are seen, the one containing the red blood corpuscles and the other being a white curd devoid of red blood corpuscles. The serum which separates out ultimately is often small in quantity, very pale, and has a tendency to re-clot.

The granulomata have a uniform appearance, no matter what their situation or degree of development. They consist of hard, yellowish masses embedded in the sharply demarcated normal tissues,

and mostly have an objectionable fœtid odour. The microscopical appearances are those of a centrally placed mass of almost completely necrosed tissue, usually containing an abundance of long branching bacteria, the whole being surrounded by a wide band of rather open fibrous tissue.

Although no very serious attempts have been made to cultivate the casual micro-organism, it will probably be a difficult matter to obtain a growth as ordinary aerobic and anaerobic methods so far tried have failed completely. Experimental production of the disease by direct inoculation of portions of a granuloma into animals has not been undertaken, but it is hoped to be able to carry out researches along these lines in the near future.

Several of the animals which proved to be suffering from the granulomatous condition call for special mention. Rabbit No. 55, which had been injected intravenously with three doses of an emulsion of lymphadenomatous gland kept in broth for ten days on ice, developed a granuloma of the tonsil and the tongue. What was thought to be a hypertrophied right lobe of the thyroid gland, subsequently, on microscopical examination, gave a picture almost identical with that found in the mesenteric glands of Rabbit 47, but there were no hæmorrhages. The significance of this case is manifest, especially in view of the fact that mitosis was active ; but there was no involvement of any of the other organs.

Rabbit No. 132 received an intracerebral injection of blood from a case of acute lymphatic leucæmia, and seven months later developed a granuloma of the posterior nares and the orbit. In this animal there was a hyperplasia of the bone-marrow, with a disappearance of the normal fat and an increase of megaloblasts. The megakariocytes were conspicuous by their densely staining nuclei, large size, and the number of englobed polynuclears. There was no evidence of infiltration of the organs with the large mononuclear cells found actively proliferating in the glands of Rabbit 55 and Rabbit 47.

Rabbit No. 131, a companion animal to Rabbit 132, and inoculated in a similar manner, became obviously ill a few days after the death of Rabbit 132. Several blood counts, carried out on successive days, showed an anæmia and a gradual rise of white cells, especially of the neutrophile polynuclears. The animal would not eat, and it was killed directly it was realized that the illness was serious and a diagnosis of granuloma of the oral cavity had been made.

On post-mortem examination a large sublingual granuloma was found. The submaxillary salivary and neighbouring lymphatic glands were swollen, as were some of the deep cervical lymphatic glands. Nothing else of note was found except evidence in the urinary

system of microsporidial disease. Microscopical examination of the lymphatic glands revealed a condition of affairs similar to that found in Rabbit 55, the large mononuclear cells being abundant and actively proliferating. The most important feature about the organs of this animal was, however, that isolated members and groups of these characteristic mononuclear cells were found infiltrating the submaxillary salivary glands, there being also a certain amount of fibrous tissue deposition surrounding the collecting tubules. The bone-marrow was normal, and the other organs showed no change associated with the condition under discussion.

The importance of these researches lies in the fact that it has long been suspected that pernicious anæmia and leucæmia of man have their origin in some obscure oral infection, and if it could be shown that this is a leucæmia of rabbits, which is with certainty a secondary manifestation of a primary oral granuloma, additional support would be given to the above-mentioned hypothesis. It is conceivable that the streptothrix concerned originated from the lymphadenomatous material injected, for although some of the infected animals have developed the disease spontaneously, without having received any injections whatsoever, it is possible that the parasite, having acclimatised itself to the body of the rabbit, is capable of infecting other animals. The fact remains that we have never previously met with the disease among a large number of animals examined, and the lesions are so striking that even if only slight, they would, in all probability, not have been overlooked.

At present no very definite conclusions can be gathered from these experiments, additional researches being necessary in order to verify or disprove the different hypotheses that present themselves. Meanwhile we conceive the train of events to be somewhat as follows: Certain of the animals become infected with a parasite, presumably a streptothrix, of unknown provenance, which parasite produces granulomata in different situations, the primary growth being, in most cases, fatal. In a few cases the disease lasts long enough to lead to the production of changes in the neighbouring structures, such as the lymphatic glands, and even infiltrative changes in the submaxillary salivary glands in one case. Exceptionally the course of the disease may be so chronic as to lead to infiltrative changes in most of the organs, with possibly a disappearance of the primary granuloma.

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Clinical Articles

DERMOID CYST IN A HORSE.

By G. A. M. HARLE, M.R.C.V.S.,
Coldstream.

I WAS called in a few days ago to see a six-year-old Clydesdale gelding which was stated to have a lump on the shoulder. The swelling was on the spine of the scapula near the tubercle, and extended for about 3 inches up the spine, being continued in a backward direction for about the same distance. The owner stated that he had noticed it for the first time when the animal had been broken in as a three-year-old colt.

Upon lancing it I found the contents to be a mass of slimy sebaceous material, in the centre of which was a matted mass of long brown hairs. There was a septum which divided the swelling into two parts, and the upper portion of the cavity contained only sebaceous material.

OPERATION FOR SALIVARY CALCULUS.

By H. SMITH, V.S.
Lambourn, Berks.

THE following instance of a large salivary calculus being removed from the mouth of a horse is of particular interest, partly on account of the observed apparent length of time which it took to form, partly on account of the large size, and particularly because it healed without any trouble afterwards.

The subject was an ordinary farm heavy draught gelding, about sixteen years old, and my attention was first drawn to the animal in August on account of a wound on the exterior of the cheek, due to an accident with the scythe. This I sutured up and the wound healed without trouble.

During the process of suturing I handled the jaw and cheek freely, and am able to assert that there was nothing abnormal. Some eleven months afterwards I was called in again to the same animal on account of a hard swelling which the owner had observed in the cheek, close up against the molar teeth. When I manipulated it I could distinctly hear it " clink " against the molars, and I had no difficulty in diagnosing it as a salivary calculus, which was situated in close proximity to the opening of Stenson's Duct.

With a scalpel I made an incision directly on to the anterior border of it *from the inside of the mouth*, and, after a little pressure, removed

a calculus weighing $2\frac{3}{4}$ ounces, and measuring 2 inches in length and $1\frac{1}{2}$ inches in its great diameter.

By the aid of a mild disinfectant to the interior of the mouth, the patient made a good recovery, and there was no recurrence of any further trouble.

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RHODODENDRON POISONING IN CATTLE.

By H. TUDOR HUGHES, B.Sc., F.R.C.V.S.
Oswestry.

As cases of this kind are not very commonly met with, the following may prove interesting to practitioners and clinicians. On Monday morning, March 17, 1924, an urgent telephone message was received from a farm some few miles away, in the direction in which foot-and-mouth disease was then prevalent, to the effect that some of the milking cows had been taken ill during the night, and were showing symptoms giving rise to alarm.

The cows came in from the field on the previous (Sunday) afternoon to all appearance in good health, and gave their usual yield of milk, otherwise suspicion of something being wrong would have been aroused, as it is a milk-recorded herd.

Early on the following (Monday) morning several cows were noticed paddling on their feet, some of them frothing at the mouth, straining, and passing small quantities of urine, and having practically no use of their legs; on inspection of the mangers three were found full of slime and cud.

On arrival at the farm and ascertaining the foregoing facts and that there had been no change in the diet of the animals, it was suggested that a search of the pasture should be made, as a result of which it was found that the animals had had access to a wood with numerous rhododendron shrubs, which on inspection bore abundant evidence of recent browsing and stripping of their leaves and flower buds. It may be mentioned that timber had been felled in this plantation, and was being dragged out and hauled away, and no doubt the men employed on this duty had not properly closed the gaps in the fence when leaving their work at the end of the week.

On examination of the herd it was discovered that seven cows were now showing serious symptoms. Their general condition was one of depression, associated in two instances with intermittent nervous paroxysms, especially about the head and neck, as though the animal were about to have a fit. There was complete loss of appetite and suspension of rumination, profuse salivation with grinding of the teeth, and spewing of the cud, which had a most unpleasant smell; straining on micturition and defæcation, and some of them passing

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small quantities of blood and gelatinous material with their motions. In one or two cases, especially in one roan cow, excoriation of the muzzle was observed, and in all cases the breath was offensive. Their eyes were staring and pupils dilated.

Both the external and internal temperatures were subnormal, associated with a feeble pulse. Temperatures and pulses varied between 99·4° and 100·2° F., and 50 to 56 per minute respectively. Respirations did not appear to be affected, except during paroxysms when some acceleration was noticed. The yield of milk was seriously diminished, but no discoloration or unnatural odour was observed.

The treatment adopted was that generally followed in cases of narcotic and irritant poisons, viz. oleaginous purgatives combined with internal antiseptics and sedatives, and followed by the administration of albuminous and mucilaginous fluids containing alkaline stimulants and carminatives.

The animals were well housed, warmly clothed, and assiduously nursed.

By the evening (Monday) it was reported that three of the cows had got warmer, and had begun to eat and had been noticed to chew their cud.

The following morning (Tuesday) another visit was made, and on the whole a considerable degree of improvement was noted. One cow, however, had spewed her cud throughout Monday, and the badly excoriated roan cow above mentioned had continued to do so during Monday night. Both were subnormal in temperature and weaker in pulse, so were given another draught as on the previous day, combined with a stimulant, together with a hypodermic injection of Sparteine Sulphate.

By the evening three more cows were reported to be better and to have regained their appetite and chewed their cud.

On the Wednesday morning all were reported to be warmer, eating, chewing their cud, and their bowels acting freely, though their motions were very offensive, as on the previous day, and micturition was now normal and free from straining. From now onwards convalescence was established and a rapid recovery took place, fortunately without a fatality.

INTUSSUSCEPTION IN A HEIFER.

By J. G. HOBAN, M.R.C.V.S.,
Whitchurch.

Subject.—A three-year-old Irish heifer, which had been in this country about a week.

History.—The animal had been noticed "off colour" for some

days, but it was ascribed to the journey. One evening she refused her hay and stood apart from the others, grunting and straining. She was housed, and a dose of magnesium sulphate was given, as she was supposed to be constipated.

Next morning I was asked to see her, the messenger saying, " She's very bad, sir, and has something queer hanging behind."

On my arrival I found the animal *in extremis*, and on looking for the " something queer behind," saw what I thought was a prolapsed rectum, but on drawing it out it came away, and I found it was a portion of bowel.

The heifer was slaughtered, and post-mortem showed a diffuse peritonitis, the result of a ruptured bowel, the rupture taking place where an intussusception had occurred in the small bowel.

The invaginated portion had sloughed off and passed on, but a very incomplete adhesion had taken place, allowing the bowel contents to escape into the peritoneal cavity.

I have seen an intussusception in the dog where it was possible to pass a whole pencil between the protruding mass of bowel and the mucous membrane of the rectum (no treatment was attempted), but this was the first case I had met with it in bovine subjects.

IS MILK FEVER INFECTIOUS?

By W. DUGDILL, M.R.C.V.S.,
Patrington.

May 15, 1924.—Message to attend at a farm four miles away. Two cows down with milk fever. On arrival found a third cow staggering and showing all symptoms of milk fever down, and unable to rise before the other two received attention, i.e. injecting udders, stimulating spine, packing, etc. All three cows had calved the day previous, and whilst on the farm I was asked to look at another cow due to calve next day and which was " down " last calving. Advised spare diet, exercise, etc., and sent draught consisting of aloes and magnesium sulphate. This animal calved to date, went down a few hours after, on the 17th, and was treated as before. All four made an uninterrupted recovery and have milked well. This man farms about 100 acres of land and only milks twelve cows, and it struck me that this must be a record percentage. The animals have been on the farm some time, the man not being a dealer. The outbreak was pretty bad, but what would it have been like some years ago? Again, was this merely a coincidence, or is there truth in the old saying that milk fever is infectious?

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JAUNDICE IN DOGS AND CATS.

By HENRY GRAY, M.R.C.V.S.
London.

THE valuable contribution that appeared in the January number of the VETERINARY JOURNAL on the elucidation of a form of enzoötic jaundice which frequently occurs in this country should prove of great interest to country practitioners, who are more often brought in contact with it than those practising in the heart of large cities. Certainly the authors of the article deserve our thanks for the services they have rendered in connection with this malady.

But it must not be concluded that because leptospira, or what was formerly termed spirochœta, has been found in one form of jaundice that it is the cause of all other forms. Even the symptoms, course, and pathological processes observed in leptospiral jaundice are similar to those found in piroplasmal jaundice and other infections.

More than twenty years ago, after studying many cases of the so-called biliary distemper coming from various parts of Great Britain and comparing them with thousands of cases of distemper as it occurred in London, I was forced into the position that the former disease had no connection at all with distemper (vide *Veterinary Record*, October 7, 1905, p. 235). Soon after this I converted the late Mr. E. Wallis Hoare (vide *ibid.*, October 25th) and some subsequent writers on the malady to my way of thinking.

After numerous investigations on the blood and tissues, I failed to detect *piroplasma*, and in consequence I had to come to the conclusion that the form of jaundice with which I had been dealing was not the same malady as that observed in tropical and Continental countries, and especially in France and Holland. On comparing the symptoms, course, and pathological lesions observed in my cases of study with the description given by others of piroplasmal jaundice, I failed to detect any difference.

I have, however, never observed in chronic cases of our enzoötic jaundice enlargement of the spleen, or in acute cases the hæmoglobinuria which is so frequently the accompaniment of piroplasmal jaundice.

Some research pathologists to whom I mentioned the matter at the time thought it was quite possible that the disease was probably due to a filter-passing organism.

As I had never seen but one or two cases of jaundice which I thought might be a complication of distemper in the many thousands of cases of distemper I have seen in the heart of London, I felt I could neither deny nor affirm that there was no such thing as biliary distemper. As there are often outbreaks of equine biliary influenza in association with a few cases of typical pink-eye form, I thought there might exist a biliary form of distemper which I had never encountered.

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As to the peculiar hæmorrhagic lesions in the lungs which frequently, but not always, appear in jaundice, I pointed this out in an article on the treatment of the disease which appeared in the *Veterinarian*, 1897, p. 516. This is also seen in piroplasmal jaundice, and I have observed a similar condition in acute septic pleuro-pneumonia in calves following on an outbreak of white scour in 1886.

In another paper on the same subject which appeared in the *Veterinary Record* about the same period I pointed out that neither malignant nor any other form of jaundice on which I had the opportunity to examine after death were due to catarrh of the bile duct, duodenal catarrh, gastro-enteritis, or to intussusception, these, when present, being merely secondary complications arising during the later period of the course of the disease. I had seen hundreds of cases of typhus, duodenal and other intestinal catarrhs, worm in the bile duct, intussusception, obstructions and tumours affecting the walls of the duodenum, without jaundice. Even tying of the bile duct will not always produce that condition. I called attention to the fact that descriptions usually given in textbooks and writings of the causation and nature of jaundice in dogs were generally traditional teachings handed down by one generation to others, who did not appear to have ever studied the malady, but blindly followed their forebears.

There is another form of jaundice which I have provisionally termed acute ictero-anæmia. This peracute form, which I do not connect with any known or conjectured cause, occurs in adult and even aged dogs. It runs a very rapid course, usually within 36 to 48 hours from the time the animal was first noticed amiss. So far as my experience goes, it always ends in death. There is no vomiting, no diarrhœa, but sudden depression rapidly running into coma. The mucous membranes appear absolutely bloodless, but in good or bright daylight they have an amber or pale greenish tint. The temperature is subnormal and the pulse is infrequent, under 30 and even 20. After breathing has stopped the pulsations become rapid and more numerous, 60 to 90 for a few minutes. The lower jaw is pendulous, and the respirations are long and deep and about 30 to the minute. On post-mortem examination all the internal organs, with the exception of the heart, are bloodless, and there are but faint traces of the main vascular branches. The stomach, bowel, bladder, and other white tissues have an amber or primrose or slight greenish tint. There is, however, a deeper staining of the outside of the white tissues in the vicinity of the gall bladder, which appears distended, but not abnormally so. This staining is evidently a post-mortem condition, and is due to bile transuding through the walls of the gall-bladder. The lungs are also white with the exception of the black spottings of anthracosis.

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The heart appears distended and as if it had been washed, so pale are its walls. All the cavities of heart and the roots of large vascular trunks for a few inches contain blood clots, small in quantity, pale in colour, soft in consistence, and of a heliotrope tint. When the clots are placed on a white marble slab it is easily noticed how rapidly the serum, which has also a pale heliotrope tint, exudes from them.

The stomach usually contains food, or a quantity of fluid with particles of food. The intestines, especially the larger one, contain a quantity of soft golden or greenish fæces.

During life it is difficult to determine if an animal is jaundiced unless examined in a good or bright daylight. In a bad artificial night light it is impossible to discover the staining of the mucous membranes, especially if they are congested.

Keratitis (ulcerative, vascular, or opalescent), simple and purulent conjunctivitis, or bleeding from the gum or bowel, may not only be found in jaundice, but also in distemper, trypanosomiasis, piroplasmosis, and other infections. The same may be said of lung, bowel, and other lesions. They are not peculiar to leptospiral, or what was until recently termed spirochœtal, jaundice.

Spirochœtes have been found to be normal inhabitants of the cells of the gastro-intestinal mucous membranes by Bizzozera, Ball and Roquet, and others; they have also been found in various lesions (tumours, typhus and other gastro-enteric maladies, and jaundice) by Lucet, Regaud, Mettam, and others. Gillard, in 1920, stated he had found spirochœtes in the mucous membrane of the duodenum of dogs suffering from jaundice. He had, however, also found them in healthy dogs (*Veterinary Record*, July 3, 1920, p. 6). So far as I am aware he is the first British author who had recorded the finding of these parasites, both in jaundiced and normal dogs. Probably they were only normal inhabitants of the viscera finding their way into lesions just like so many other micro-organisms do when the system is depressed by some foreign invasion (vide *Hoare's System of Veterinary Medicine*, Vol. I, 1913, pp. 742 and 1225. Whether these spirochœtes which have been so frequently encountered in dogs have any relationship to *Leptospira ictero-hæmorrhagica* remains to be seen.

In conclusion I would like to mention that a few years ago in the *Veterinary News*, which I am sorry to say is now defunct, and in some lay papers (*Bazaar*, March 31, 1923) I drew attention to the researches of those Japanese workers on spirochœtal jaundice (or Weil's disease) in man caused by rats and field-mice suffering from the same infection, and suggested that probably the prevailing form of jaundice in this country had a similar origin, and that the matter was well worth inquiring into.

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DEATH FOLLOWING ORDINARY CASTRATION OF THE MALE CAT.

By T. W. E. PUGH, M.R.C.V.S.,
Sevenoaks.

During the earlier part of this summer the writer had the misfortune to lose five cats within a fortnight following the operation of castration. The history was the same in each case, it being remarked by the owners that the cats appeared well and happy on returning home, but sickened suddenly about thirty-six hours later. Death followed invariably within forty-eight hours, the cats showing great depression and violent retching movements.

Post-mortem examination in the last two cases encountered revealed numerous petechial hæmorrhages into pleura, pericardium, myocardium and peritoneum, and a diffuse gastro-enteritis. The mesenteric glands were enlarged and congested. The scrotum and pelvis appeared to be quite normal and free from sepsis.

As the writer makes a rule of keeping his scalpels in crude lysol between operations, it appeared that infection must be entering the cat's body by some route other than through the scrotal wound.

A special box is used for controlling cats during castration. It was decided as a first measure to disinfect the inside of this box with wood creosote. The fatalities ceased forthwith.

It was thought that this experience might have been quite an isolated and rare occurrence, and therefore the matter was not recorded. However, during the last two months two other practitioners happened to mention that they were suffering from undue losses in their castrated cats. The suggestion that they should disinfect the box or other apparatus used for controlling the cats met with a similar immediate beneficial result.

The writer concludes that should a cat happen to be castrated during the incubative stage of one of those rapidly fatal infections (usually classified as feline typhus), then the head end of the contrivance used to control the cat becomes contaminated with the virus of the disease and serves as a focus for infecting all subsequent cats coming for castration.

This matter has been brought forward in case any other practitioners have been worried in a similar way and have not chanced to discover the remedy.

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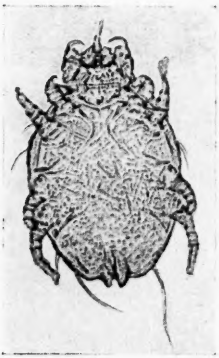
CHEILETIELLA PARASITIVORAX MEGNIN, CAUSING LESIONS IN THE DOMESTIC RABBIT.

By A. W. NOËL PILLERS, F.R.C.V.S.
Liverpool.

It is generally stated that the above mite, which belongs to the family *Cheiletidæ* (*Cheyletidæ*) is a harmless inhabitant of the fur of rabbits and hares. Hirst, Lombolt and myself have recorded it from the cat. Allied species are found on birds. Whilst Railliet, Megnin, Neumann, and Hirst refer to its non-pathogenic rôle, Canestrini states that it insinuates itself between and under the epidermal scales. Lombolt, in the *Hospitalstinde, Copenhagen*, for 1918, page 1098, gives an account of two cases of mange in man, stated to be due to this acarus. Infection was traced to cats; the lesions were raised red spots on the neck and limbs, and there was marked irritation. Recently whilst inspecting a donkey which was thought to be suffering from reportable mange, the owner pointed out an English rabbit, which had its freedom in the same paddock, as a most likely source of infection. I have often heard and seen reports of cases of equine scabies, where infection had been wrongly traced to cats and rodents affected with notoedric mange. Although the common itch of the rabbit is also due to *Notoedrus* (*Notoedres*) the sarcoptic and psoroptic forms are encountered, but this is not so in the case of the cat. Scrapings from both animals were taken; that from the donkey was negative and the lesions were undoubtedly due to the blood-sucking louse *Hæmatopinus macrocephalus*, but the one from the rabbit contained enormous numbers of *Cheiletiella parasitivorax*. Just prior to being caught it was apparently rubbing its back under the lower edge of a small summer-house which was slightly raised from the ground. The affected area, about 1½ inches wide, extended along the spinal region from the shoulder-blade to the sacrum. The fur over this area was almost wanting, and in its stead was a layer of heaped-up epidermal detritus and parasites. This material was easily removed by rubbing, when a moist hairless lesion became visible. On being confined to a hutch and the parts brushed every other day with a dandy brush, the condition



Cheiletiella parasitivorax, female; ventral aspect; × approx. 90.

completely cleared up. From the history, symptoms, and subsequent disappearance of the lesions, I think it may be affirmed that the acarus was the cause, and that the use of the dandy brush together with the removal from rubbing places were responsible for the cure, by bringing the mite population down to reasonable numbers.

Abstracts of Current Literature

Kleiger, I. J., and Weitzman, I.—Experimental Study of Trypanosomiasis in Palestine.—*Annals of Tropical Medicine and Parasitology*, Vol. xviii, No. 4, December 30, 1924.

THE authors have been experimenting on trypanosomiasis with "Bayer 205." The animals used to test its curative power were dogs, rabbits, and guinea-pigs. The disease in the rabbit and guinea-pig resembles that in the mule. Leucopænia and anæmic elements are constant throughout infection, but disappear when the animal is cured. It was sought to determine the minimum single dose which will uniformly sterilise infected animals. The injections were made intraperitoneally from 5 or 10 per cent. solutions of the drug. Doses of 0·1 gm. per kilo or over sterilised all rabbits and guinea-pigs without exception. It was found from the experiments that a single dose of "Bayer 205" was capable of sterilising the blood of dogs, rabbits, and guinea-pigs infected with a virulent strain of trypanosomes (*Trypanosoma evansi*) with the apparent production of a permanent cure. The drug was administered at various stages of the infection, always with the same results.

It was noted that the drug was highly toxic for rabbits and guinea-pigs. Several animals died within a short time after the administration of the drug without any apparent clinical cause. A dose of 0·4 gm. per kilo of body-weight killed a medium-sized guinea-pig (460 gms.) in four days. The tests showed that for the guinea-pig at least the therapeutic dose is approximately one-fifth to one-eighth of the lethal dose. It was also ascertained that the drug affords a considerable protection, and that the degree and duration of the protection varies with the amount of drug administered and the individual animal. It is noteworthy that the drug given shortly after the infection, that is during the incubation period, did not prevent the development of the disease.

An outbreak of trypanosome infection in mules in Northern Palestine afforded an opportunity for this experimental study. The morphology of the parasite, the clinical picture of the disease, and the pathological lesions produced, indicate that the strains belonged to

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the *T. evansi* group. The mechanism of the action of the drug is of interest. *In vitro* it has very little trypanocidal power, even in a concentration of 1 : 100 taking 24 to 48 hours to immobilise the parasites. *In vivo*, on the other hand, so small a dose as 0·05 gm. per kilo suffices to sterilise the blood of a heavily infected animal in about 16 hours.

Experimental evidence is advanced in favour of the view that a real immunity or resistance to infection is set up in the body of animals cured from an infection. This immunity or resistance seems to be associated with the formed elements of the blood. Repeated search failed to reveal any of the usual humoral antibodies (agglutinins, lysins). On the other hand, profound changes occur in the white blood cell formula during the infection and after treatment. In this connection it is significant that the injection of " Bayer 205 " causes a marked increase in the white cell count, particularly the large mononuclears. The defence of the body against trypanosome infections, and perhaps also to other protozoan infections, such as malaria, seems to lie in the cellular response rather than in the humoral antibodies.

Taylor, E. L., M.R.C.V.S.—Notes on Some Nematodes in the Museum of the Liverpool School of Tropical Medicine.—*Ibid.*

MR. TAYLOR gives descriptions, measurements, and habitat of seven nematodes he has examined, found respectively in the crocodile (2), *Agama colonorum*, lizard, *Bufo regularis*, cow and dog. The worms in the crocodile inhabit the stomach, the intestine in *Agama*, and the intestine in the cow. Good illustrations of the various parts of the worms are given.

Cameron, T. W. M., M.A., B.Sc., D.Ph., M.R.C.V.S.—The Dog as a Carrier of Disease to Domestic Animals. *The Scottish Journal of Agriculture*, Vol. vii, No. 4, October 1924.

THE author reviews and shortly describes the affections that may be spread by the dog to other animals of the farm. He includes in the list : rabies, anthrax, foot-and-mouth disease, tuberculosis, hydatid, gid, sheep measles, tongue worm (found in the nasal passages of the dog), ticks, and mange.

The address on this subject was given to farmers, and the author advises that all farm dogs be properly restrained and all infective material destroyed. He also advocates periodical inspection of dogs for parasites, feeding dogs on good clean food, the avoidance of infective offal, and regular and proper treatment for tapeworms.

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Perlis, Dr. R.—A New Method of Anæsthesia by Intravenous Use of Somnifene in Obstetrics and Surgery: Indication for Use, Technique, and Results.—*Presse Médicale*, 1924, No. 65, p. 675.

R. PERLIS has been conducting research at the Hospital of Mercy, Paris, in connection with somnifene, and has sought to use the venous way to produce *general anæsthesia*, and it appears that he has been successful. Somnifene can be used in obstetrics to obtain anæsthesia whilst preserving the reflexes and allowing the physiological act to be performed normally. The pain only is allayed. In surgery, as Tapernoux declares, one can obtain complete general anæsthesia, suppressing at one and the same time the reflexes and muscular defence.

In obstetrics no contra-indications appear to exist against its use; according to P. Fredet, this product is in no way toxic. It can be used in primipara as in multipara; it is used when labour has commenced; this proceeds normally; the time occupied in dilatation is markedly diminished, the period of expulsion is often accelerated, and no harmful effect either on the mother or child has been noticed. Lying-in women receiving somnifene declare themselves to be absolutely enchanted, and resolve never to be delivered otherwise.

The technique is simple: one injects slowly (two or three minutes) into a vein a dose varying from 6 to 9 c.c. (according to the weight and general state of the subject) until sleep is obtained. This sleep lasts from three to five hours; somnolence lasts from twelve to twenty-four hours, and during this time the patient may be incited to drink, eat, and urinate, which are all done voluntarily.

To obtain surgical anæsthesia the technique is the same: yet it is important to practise about half an hour previously an injection of scopolamine-morphine, morphine alone, or pantopon. The endovenous injection of somnifene is always done *very slowly* until sleep is obtained (in two to three minutes); the doses vary from 5 to 10 c.c. according to the weight, age, and general condition of the subject; anæsthesia lasts three hours at a minimum, which allows for long operations leisurely performed. The operation over, the patient will sleep from twelve to twenty-four hours, although aroused to eat, drink, urinate, etc.

Endovenous injection of somnifene (Roche) allows the surgeon to operate without help if so desired or necessary. On the other hand, in this way toxic or inflammable vapour is suppressed. As the subject never vomits, one can give food and drink and avoid thirst or acidosis of the young. Above all, it seems from the researches that syncope need never be feared nor any harmful action on the lungs, liver, or kidneys. Briefly, this new mode of anæsthesic seems harmless, easy

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of technique, certain in effect, well accepted and borne by sick and parturient subjects, and that it marks progress in anæsthetic procedure, and, indeed, somnifene appears to be the ideal anæsthetic.

Bach, E., of Thun.—Rupture of Muscle after Milk Fever.—*Schweizer Archiv für Tierheilkunde.*

In thirty-two years' practice I have only had this happen three times, and always after severe cases where I have been called in too late.

The first case affected the croup muscles. After being recumbent for six days, the cow was got up, but she was very weak. The appearance of the pelvic region was abnormal, the muscles of the croup swollen and tumefied. The weakness continued, and slaughter was necessary. In microscopic preparations torn muscle was disclosed. The muscle fibres were torn, disintegrated, and in parts had lost their cross striping. Close to the muscle fibres blood corpuscles were scattered about.

The second case affected the peroneal muscles of both hind limbs. After long lying the cow got up with great effort. Both hocks dropped deeply, the peroneal muscles were painfully swollen and doughy. The cow could only stand for about two minutes, and was slaughtered.

In the third case the muscle under the right stifle was attacked. The lameness was similar to that which arises from rupture of the *tibialis anticus*. Under the stifle-joint a doughy painful swelling arose. The joint could not be made use of to progress. Hæmorrhage into the torn muscle region was considerable, so that the whole lower part of the thigh was considerably swollen. The appetite was normal, as well as the quantity of milk given. The cow recovered.

Czerny and Helene Eliasberg.—The Treatment of Severe Tuberculosis of Children with Cattle Serum.—*Jahrbuch f. Kinderheilkunde*, vol. 52, p. 321, 1923.—*D. T. W.*

The authors have previously proved that by the use of protein substance therapy, accompanied by repeated injections of horse serum, tuberculosis of children can be checked and healing be brought about. The present account concerns tuberculosis of children treated by serum produced on the initiative of Uhlenhuth at the Marburg Serum Factory. Cattle are injected intraperitoneally with ascending doses of weakened tubercle bacilli, little virulent for guinea-pigs and scarcely virulent for rabbits. In the last injections the animals receive the extreme amount of 40 to 60 grammes of fresh culture. Apart from a rise of temperature for several days, the animals show no symptoms of disease after the injections, but on the contrary exhibit increases in weight.

At the age of one to thirteen years, twenty children received daily a subcutaneous injection of serum, beginning with a dose of ½ c.c. and ascending to 2 c.c. In these doses the injections could be given two hundred times or more without upsetting the health of the patients. The children concerned all suffered from lung tuberculosis, in some cases combined with laryngeal, abdominal, skin and bone tuberculosis. The authors declare that they have had better results with this new serum than with their former method of treatment, for with it not only the cachexia of the patient but also the tuberculosis process itself has been influenced.

In certain cases the following was noticed. The best results were seen in children during the first year of life with a more or less widespread infiltration area in the lungs. These foci declined and the children gave the impression of being temporarily cured. The course was similar in closed hilus-tuberculosis of older children. Open phthisis of younger and older children showed no improvement by the disease process was brought to a standstill, with an inclination to shrinkage, decline of fever, decrease in sputa. In two children with disseminated tuberculosis of the lungs the new therapy did not check it. These cases did not react to tuberculin. External tuberculosis was favourably influenced under this treatment.

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Sendrail, Lasserre, Lesbouyries.—Tuberculosis of the Dog.—Focal Reactions to Tuberculin.—*Revue Vétérinaire*, May, 1923.

It has already been shown (April and December issues, 1920) that the subcutaneous injection of tuberculin practised on dogs affected with diffuse osteo-periostitis and visceral tuberculosis will induce disturbances in the locomotor system, and that these latter may be regarded as "a true specific local reaction," disappearing at the same time as the other signs, which constitute positive reactions to tuberculin.

These local reactions seem therefore to be of great interest to the clinician, since they may indicate the osseous and articular lesions at their point of origin, when they are little suspected on clinical examination.

The authors then give instances of three dogs affected with tuberculosis where osseous and articular lesions were accentuated and plainly discernible after the injection of 1 c.c. of tuberculin subcutaneously. One dog had abdominal dropsy, another rectal and perineal fistulas and ulcerations showing no tendency to heal, and the third had a swelling the size of a billiard ball on the carpus. Temperatures were taken every two hours from the seventh or eighth to the twentieth or twenty-first hour. All the dogs reacted to the

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tuberculin. The dogs were autopsied and found to be tuberculous, and material from the lesions mixed with boiled water caused tuberculosis in experimental animals. Lameness and pain in joints and limbs were quite marked after the tuberculin injections. The same phenomenon has been observed in human medicine. Poncet writes that several times he has observed arthralgias and acute synovites after subcutaneous injections of Koch's lymph. Lannelongue also and Milian report local reactions at the site of rheumatic articulations. These facts are therefore of considerable interest from a clinical and comparative pathology point of view. It is logical to consider the lesions indicated after injection of tuberculin as being specific.

The injections reveal the existence of osseous lesions, articular or synovial and still discrete, escaping the eye of the clinician, who is more intent on discovering signs of visceral tuberculosis about which he has most likely been consulted. Veterinary pathology confirms once more certain findings in human medicine. Osteo-articular and synovial lesions of our carnivora sometimes, as in man, point to tuberculosis; they may be of bacillary origin or simply toxinic; tuberculin will reveal them by setting up focal reactions. Where joints and limbs and other lesions are suspected of being tuberculous and diagnosis is uncertain, tuberculin should be employed.

Helm, Alfred.—The Occurrence of Avian Tubercle Bacilli in the Local (Pharyngeal and Mesenteric) Lymph Glands of Swine and the Frequency of Tuberculosis in Swine.—*Zeitschrift f. Fleisch und Milchhygiene*, 1923.

THE susceptibility of swine to avian tubercle bacilli is rather great, 80 per cent. of experimental animals could be infected. That natural infection often takes place in this way was shown by an examination of fifty-two cases of local mesenteric nodules and thirty-four cases of localised pharyngeal tuberculous nodules. Of doubtful cases examined, 80 per cent. showed infection by the bovine bacillus and 20 per cent. were of the avian type. (Thus cattle and fowls may give tuberculosis to pigs.)

On the Treatment of Foot-and-Mouth Disease.—*Schweiz. Arch. Tierhlkd.*, Vol. 64, p. 525, 1922.

AN official communication has been issued by the associated veterinary commission on the above subject. Subacute forms of foot-and-mouth disease and that in young cattle and calves having alone been treated with moderate success by means of polyvalent vaccines and injection of blood of recovered subjects, investigations have now been made on the chemotherapeutic side to try and discover a successful treatment. Rousseau treated many sick animals successfully with Menières solution, which consists of guiacol 10·0, acid benzoic 2·0,

alcohol 8·0, distilled water 1000·0. This is injected subcutaneously or intravenously in doses of 200–1,000 grammes, which is from 1 to 2 grammes per kilogram of body weight. It is more of a therapeutic than prophylactic remedy. The associated veterinary body have tested the remedy in the cantons of Bern and Unterwalden and report generally favourable results. This therapy has the additional advantage of cheapness, 1 litre of the mixture costing about 2 francs, whereas 1 litre of serum costs 80 to 100 francs.

It has always seemed to us that there is some weakness in scientific circles in experimental work and research in connection with chemotherapy as applied to the prevention of foot-and-mouth disease and its spread. The uses of quinine in malaria, atoxyl and tartar emetic in surra, insulin in diabetes, ethyl chaulmoogrates in leprosy, all point to the value of chemical and biological treatment of disease, and these agents seem to be overtaking vaccines and sera in their value and range of employment. It is conceivable that in this direction will lie the most effective remedy against the occurrence and spread of foot-and-mouth disease, but very little research and investigation has been conducted therein.

Reviews

Les Maladies du Porc. By G. Moussu. Professor at the Veterinary School of Alfort and at the Agricultural Institute. Second Edition. Paris: Vigot Frères, 1924. Price 20 francs.

More attention is now given to the diseases of pigs than formerly, and this manual is well worth perusal by those who desire information on porcine ailments. The times have changed for the pig, and whereas in the past many little homesteads kept a pig, to-day the country is studded with dilapidated and deserted pig-sties, and large herds and the industrial production of pig flesh hold the field. Through this change the spread of disease is facilitated, less easy to control, more costly in its suppression, and consequently a knowledge of the special maladies of hogs is desirable.

The number of pigs in France is gradually growing, but it is not yet at pre-war figure. In 1913 there were 7,305,850 head; in 1922 the figures were 5,195,740.

The book is divided into three parts. Part I deals with the production and housing of pigs; Part II with the principal operations on the pig; and Part III with the diseases of the pig, consisting of thirteen chapters, the last one dealing with infectious diseases. The author seems a bit old-fashioned in his penchant for bleeding. He bleeds from the ear, inside of the forearm or outside the hock in respiratory diseases, and actually advocates cutting the tail off occasionally (because "it has a real practical value in that it can be performed by everybody"—we fail to see the logic of this). We think if he was a general practitioner in this country and adopted such measures he would be likely to get into trouble. Among the infectious diseases are hog cholera, contagious

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pneumonia, and infectious enteritis, as three distinct maladies. The text would seem to indicate that the infectious enteritis of the pig in France corresponds to our swine fever, but the illustration opposite page 231 of grave lesions of the ileo-cæcal valve region in hog cholera leaves one in doubt. One cannot help envying the state of health of the pigs of France, for hog cholera is " only of mediocre importance " and infectious enteritis " very rare." Methylene blue in doses of 7 to 15 grains per pig is stated to have given surprising results in infectious enteritis. There is an excellent chapter on tuberculosis in the pig which is well illustrated. We consider the manual to be more satisfactory in the causes and symptoms departments than in that of the treatment. It is a pity that the author never seems to have heard of giving medicine to pigs in electuary form. As we grow older we find that this method is very valuable, and with intelligent prescribing it is often effective and appreciated both by the pig and the client. One paragraph appearing on page 58 reads as follows: " Unfortunately, the difficulty is to cause drugs to be absorbed, for it is always dangerous to resort to force in the pig. *Recourse must be had to milk or meat balls as excipients.*" We can only describe this as " tosh." The book is well worth reading. It is illustrated both in the text and in coloured plates, and handy in size.

Manuel d'Obstetrique Vétérinaire. By O. LEBRUN. Second Edition. 176 pages, with 33 figures in text. Paris: Vigot Frères. Price 8 francs.

Monsieur Lebrun has been engaged in obstetrics in a country practice for thirty-six years, and in writing this handy little manual has had no other object than that of benefiting young practitioners from the experiences he has gained. During a quarter of a century clinicians have recorded numerous observations on difficult calving and foaling cases, and M. Lebrun has had many opportunities of testing the utility and application of the methods described.

The book is divided into five parts. Part I deals with the Preliminaries of Intervention; Part II, Difficult Parturitions; Part III, Accidents of Gestation; Part IV, Obstetrical Operations; Part V, Accidents following Parturition.

The ground covered comprises comprehensively the happenings one meets with in practice. The book may be easily read by any veterinary surgeon acquainted with the French language. The subject matter is well thrashed out, and denotes much thought on the part of the author, and is indicative of infinite patience and skill in endeavouring to bring his cases to a successful issue. He appears to use a general anæsthetic only in the case of eversion of the womb and difficult parturition in the mare. We think time and labour may be saved by a studied adoption of general anæsthesia in the cow. The putting of a cow on her back, raising her hind end, and working thus in hind-end presentations is good enough when facilities exist for doing so, but on many farmsteads in the British Isles the structure of the cow-sheds would make this a matter of great difficulty or even of impossibility. Besides, why waste time? For in most breech presentations amputation at the hip-joint alone will bring the case to a fairly quick and successful conclusion. The danger of rupture of the womb by fiddling about trying to get the hind legs up, or even getting them up, is avoided by disarticulation at the hip-joint.

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Diseases of the Horse's Foot. By H. CAULTON REEKS, F.R.C.V.S., Second Edition. Pp. xii–568; 193 plates. London: Baillière, Tindall & Cox. Price 21s.

The second edition of this book will be welcomed by the members of the profession, and the mere fact that a book of nearly 600 pages can be devoted to such a small portion of the horse's body, in such a manner that every page of it contains facts which are both interesting and useful, shows how much our profession is advancing. It is by specialising, as Mr. Reeks has done, that advances are made, and it has been unfortunate for our profession in the past that more has not been done to spread knowledge by individual effort in this way. To single out any particular chapter or paragraph as being of more use than another would be almost impossible, for every part of it is of value equally to the student at college and to the practitioner, whether the latter is settled down in town or country. It is a work which should be kept close at hand in every practitioner's library.

The Indian Veterinary Journal. Vol. I, No. 1. Madras: 18 Wallajah Road, Mount Road.

A RECENT addition to veterinary journalism is *The Indian Veterinary Journal*, which has been published as the result of a resolution which was passed at the All-Indian Veterinary Conference held in March 1924.

It is stated to be purely a non-official organ, and entirely managed by Indian veterinary graduates under the Editorship of Mr. R. S. Rao. Its policy is stated to be to promote the objects of the Association and the keeping of the interests of the profession before the public and the Government.

The subject matter commences with a full report of the Second All-Indian Veterinary Conference, including the Presidential Address, a number of important resolutions connected with the control of animal diseases, veterinary educational subjects, and the reorganisation of the Civil Veterinary Department. Apparently the meeting was a very enthusiastic one.

The first issue contains in all some 74 pages, and the clinicals, eight in number, are reported in careful detail, whilst abstracts are made from the veterinary press of other countries.

Annual Report of the Camel Specialist of the Punjab (1923–4).

THIS small booklet of some dozen pages is a record of work done in connection with Surra, its spread and treatment. The introduction by the Director of Agriculture, however, indicates that all is not well for the future. In 1921 a survey of the blood-sucking flies and ticks of the Punjab was commenced by Mr. H. E. Cross, in order to determine which species were the vectors of Surra, and a considerable amount of valuable research work was undertaken. In March of the following year, owing to a dispute between the Punjab and Indian Governments as to which should bear the expenses of the survey, it was decided to abolish the Institute, and in 1923 the work was discontinued in a completely unfinished state. Cross's work on the fly survey, and his discovery of the use of Tartar Emetic in the treatment of the disease, were both of the greatest importance; and it is very undesirable that such work should be discontinued on the plea that the Government of India receives more

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benefit from the work than does the Punjab and should therefore finance the scheme. This procedure is decidedly reminiscent of some of the more telling fables of Æsop. As the Director of Agriculture points out, the local benefit received is very considerable, and we most emphatically regret the short-sighted policy of the Punjab Government in prematurely concluding a scheme of research which not only holds great promise for the future, but has already produced results of such economic importance.

An Introduction to Practical Bacteriology. By MACKIE and MCCARTNEY. Pp. 300. Edinburgh: E. and S. Livingstone. Price 8s. 6d.

THIS little book of three hundred pages, by the Professor and Lecturer of Bacteriology in Edinburgh University, is intended primarily for students of human medicine, but is arranged on such a general plan as to be suitable for those engaged in the comparative side. The authors are not only well-known bacteriologists, but as they are responsible for the teaching of the subject to those taking the degree of B.Sc. in Veterinary Science, they are peculiarly fitted to produce a book suitable for all aspects of medicine. All the important veterinary organisms—with the exception of the bacillus of necrosis—are treated from the laboratory point of view. The volume is divided into a general section on biology, methods and technique (including an interesting section on the use and abuse of the microscope), and chapters on special methods and diagnosis of the various organisms. All the important biological methods in modern use are described in detail.

The volume is a most helpful one, and can be recommended to all whose work requires a knowledge of practical bacteriological methods.

Correspondence

FIELD DISTEMPER COUNCIL.

To the Editor of the VETERINARY JOURNAL.

Windsor House,
Bream's Buildings,
London, E.C. 7.

SIR,—

In consequence of the lamented death of the late Duke of Beaufort, formerly President of the *Field* Distemper Council, that office has been accepted by the Duke of Portland, with the Duke of Buccleuch as Vice-President, and Colonel George Lane Fox, M.P., as Chairman. The present Duke of Beaufort has joined the Council. The Fund is still in need of donations and subscriptions, and all communications on the subject should be addressed to Mr. E. W. Moss-Blundell, Organising Secretary, Windsor House, Bream's Buildings, London, E.C. 4. The American Distemper Committee has during the past year closely co-operated with the *Field* Distemper Council, and made its aim known in all parts of the United States, with the result that donations and subscriptions from their American supporters have continued to reach the Council in London. It should be noted that the Council can only accept responsibility for such photographs of its Laboratory and Kennels at Mill Hill (with descriptive titles) as have been sent out, free, to the whole Press by the Council's Hon. Secretary.

THE THIRD REPORT OF THE TECHNICAL SCIENTIFIC COMMITTEE TO THE "FIELD" DISTEMPER COUNCIL *is dated October* 2, 1924, *signed by Professor C. J. Martin, C.M.G., F.R.S., and was read at the Council Meeting of November* 25, 1924. *The following extracts from it may be of general interest to subscribers and your readers :—*

"The principal matter on which the Committee have at this time to make report is the completion of the special isolation compound and kennel buildings at the Field Laboratory of the Medical Research Council, and the inception and progress there of the breeding of a clean stock of puppies which forms the first phase of the main programme of investigation. Various preliminary and subsidiary pieces of work were mentioned in the previous report; these are being continued as occasion arises or opportunity occurs, and do not, for the most part, call for further mention at present. Following a visit of inspection by members of the *Field* Distemper Council and others, the compound was completed and closed at the beginning of June 1924. Plans and photographs of the compound and buildings have been published, and a description of the anti-infection discipline enforced has been given in previous reports. . . .

"Since there have been two kennel-maids the work has proved to be well within their own compass, as was expected. In addition to ordinary cleaning materials and implements, a hose-pipe is laid on in the kennels and greatly diminishes the amount of rough work required. The arrangements are working smoothly and have proved quite satisfactory. Experience showed, however, that it was desirable to relieve the kennel-maids of part of their own household tasks, and to this end a daily servant was engaged. This arrangement has been found satisfactory. The servant, of course, conforms to the routine discipline as to bathing and change of clothing on entering the compound, and she does not enter the actual kennels. . . .

"Our experience with puppies has not been without value, as a guide to the further conduct of the work, and it has emphasised the difficulty of procuring an uncontaminated stock of animals. A collection of puppies, all born in the compound from bitches introduced from quarantine, is now being reared. There are now in the compound 22 puppies, 4 mothers, and 4 bitches still to whelp; two litters already have been weaned and their mothers removed. The other bitches are to be removed as soon as practicable. It is not at present considered desirable to breed second litters from the parent bitches. . . .

"The aim at present is to see whether the puppies can be brought successfully, without signs of disease or infection, to weaning age. It is hoped to raise a generation born inside the compound and never having had distemper, and from this a generation which has never even been in contact with animals that have at any time had distemper. Should it be necessary, resort may have to be made to some alternative procedure, such as rearing the puppies by hand. In the meantime there are no untoward signs among the animals now in the compound."

From this report it will be seen that the research is following its normal course, and that in all probability within the period named in the Council's first appeal we shall have arrived at a greater knowledge of the causes of distemper and of means for its control than has ever before been obtained.

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The advantages of that will not by any means be limited to those benefits for every race of dogs all over the world, which have invariably been the first care of all members of the Council.

PORTLAND (*President*),
G. R. LANE FOX (*Chairman*),
THEODORE A. COOK (*Hon. Secretary, "Field" Distemper Council*).

Personal

CONGRATULATIONS to Professor Vallée on his election as a member of the Academy of Medicine of France; also to Sir John McFadyean, and Professor de Jong (of Leyden), who have been elected as Foreign Correspondents.

Amongst the list of those who recently received honours at the hands of His Excellency the Governor of Bengal, we are pleased to note the name of Mr. D. K. Dey, G.B.V.C., the Assistant Principal of the Bengal Veterinary College, who received the title of Rai Sahib.

ERRATUM.

IN Messrs. C. J. Hewlett's advertisement on page viii of the January issue we regret that a mistake was made in that the headings of the specialities advertised were transposed.

They should have read

UNG. IODERMIOL
Hewlett's Stainless Iodine Ointment.

ANTITHERMOGEN
(Hewlett's)
An Antiseptic and Absorbent Dressing for Wounds, Inflammation, etc.

and not as shown.

NOTICES

All communications should be addressed to 8 Henrietta Street, Covent Garden, London, W.C. 2. Telephone: Gerrard 4646. Telegrams: "Baillière, Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Binding Cases for Volume 80 and any other previous volumes can be obtained from the publishers. Price 2s. 9d. post free.

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required, not later than 23rd.

Annual Subscription, 21s. ($5.00 U.S.A. currency) post free.

BACK NUMBERS.

Readers having back numbers of the VETERINARY JOURNAL which they are willing to sell should refer to the Publisher's notice on page xviii.